



■ Features :

- ZVT technology to reduce power dissipation and improve efficiency
- Various output configuration is selectable
- Built in active PFC, PF>0.95
- Universal AC input/ full range
- Remote Control on every individual output module
- Remote Sense on every individual output module(MS-75,150,300)
- Built in parallel function(MS-300)
- Protections:Short circuit/Over load/Over voltage for all output modules
- Additional 12V/0.1A auxiliary output for remote control
- Cooling by built-in DC fan with fan alarm function
- 3 years warranty



Output Configuration Guide

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SLOT1 SLOT2 SLOT3 SLOT4 SLOT5 SLOT6 SLOT7

→ 450/650/1K0(450W/650W/1000W)

→ Modular Power with PFC

※450W/650W(5SLOT) Parallel or option code →

※1000W(7SLOT) (See Table 1.)

Example: MP1K0- A 2 E # S 2 K

SLOT1 → O/P:2V@25A

SLOT2,3 → O/P:12V@25A

SLOT4 → Blank Slot

SLOT5 → O/P:5V@10A
12V@4.2A

SLOT6,7 → O/P:48V@6.3A

Single output(MS-150) 1 SLOT (150W max.)		Single output(MS-300) 2 SLOT (300W max.)		Single output(MS-75) 1 SLOT (75W max.)		Dual output(MD-100) 1 SLOT (100W max.)	
Voltage code	Voltage	Voltage code	Voltage	Voltage code	Voltage	Voltage code	Voltage
A	2V	2A	2V	L	3.3V	R	5V
B	3.3V	2B	3.3V	M	5V	S	5V
C	5V	2C	5V	N	12V	T	12V
D	7.5V	2D	7.5V	O	15V	U	5V
E	12V	2E	12V	P	24V	V	24V
F	15V	2F	15V	Q	48V	W	12V
G	18V	2G	18V			X	15V
H	24V	2H	24V				15V
I	27V	2I	27V				
J	33V	2J	33V				
K	48V	2K	48V				

SPECIFICATION

MODEL	PFC-450	PFC-650	PFC-1000	
INPUT	VOLTAGE RANGE 85 ~ 264VAC 120 ~ 370VDC			
	FREQUENCY RANGE 47 ~ 63Hz			
	POWER FACTOR PF>0.95/230VAC PF>0.98/115VAC at full load			
	EFFICIENCY Note.1	83% typ.	85% typ.	85% typ.
	AC CURRENT	6.3A/115VAC 3.2A/230VAC	9A/115VAC 4.5A/230VAC	13.5A/115VAC 6.7A/230VAC
	INRUSH CURRENT	25A/115VAC 40A/230VAC	30A/115VAC 50A/230VAC	20A/115VAC 40A/230VAC
	LEAKAGE CURRENT	<1mA/240VAC		
OUTPUT	TOTAL OUTPUT POWER 450W max.	650W max.	1000W max.	
PROTECTION	OVER TEMPERATURE Thermal switch detect on the heatsink of power MOSFET Protection type : Shut down o/p voltage, recovers automatically after temperature goes down			
	FAN ALARM Output shutdown when FAN is malfunction			
FUNCTION	REMOTE CONTROL RC+/RC-: 0 ~ 0.8V or Short, Power ON RC+/RC-: 4 ~ 12V or Open, Power OFF			
	AUXILIARY POWER(AUX) 12V@0.1A(only for Remote ON/OFF Control)			
ENVIRONMENT	WORKING TEMP. -20 ~ +70°C (Refer to output load derating curve)			
	WORKING HUMIDITY 20 ~ 90% RH non-condensing			
	STORAGE TEMP., HUMIDITY -40 ~ +85°C, 10 ~ 95% RH			
	TEMP. COEFFICIENT ±0.03%/°C (0 ~ 50°C)			
	VIBRATION 10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes			
SAFETY & EMC (Note 5)	SAFETY STANDARDS UL60950-1, TUV EN60950-1 Approved			
	WITHSTAND VOLTAGE I/P-O/P:3KVAC I/P-FG:1.5KVAC O/P-FG:0.5KVAC			
	ISOLATION RESISTANCE I/P-O/P, I/P-FG, O/P-FG:100M Ohms/500VDC			
	EMI CONDUCTION & RADIATION Compliance to EN55022 (CISPR22) Class B			
	HARMONIC CURRENT Compliance to EN61000-3-2,-3			
OTHERS	EMS IMMUNITY Compliance to EN61000-4-2,3,4,5,6,8,11; ENV50204, EN55024, EN61000-6-1, EN61204-3 Light industry level, criteria A			
	DIMENSION	254*127*63.5mm (L*W*H)	278*127*63.5mm (L*W*H)	278*177.8*63.5mm (L*W*H)
	PACKING	1.8Kg(typ.); 6pcs / 11.8Kg / 1.25CUFT	2.16Kg(typ.); 6pcs / 14Kg / 1.34CUFT	3Kg(typ.); 6pcs / 19Kg / 1.74CUFT

SPECIFICATION

■ 1 SLOT Single output (150W) MS-150

OUTPUT (MS-150)	OUTPUT VOLTAGE CODE	MS-150A	MS-150B	MS-150C	MS-150D	MS-150E	MS-150F	MS-150G	MS-150H	MS-150I	MS-150J	MS-150K	
	DC VOLTAGE	2V	3.3V	5V	7.5V	12V	15V	18V	24V	27V	33V	48V	
	RATED CURRENT	25A	25A	25A	18A	13A	10A	8.5A	6.5A	5.8A	4.7A	3.2A	
	CURRENT RANGE	0 ~ 25A	0 ~ 25A	0 ~ 25A	0 ~ 18A	0 ~ 13A	0 ~ 10A	0 ~ 8.5A	0 ~ 6.5A	0 ~ 5.8A	0 ~ 4.7A	0 ~ 3.2A	
	PEAK LOAD <small>Note.4</small>	30A	30A	30A	20.7A	15A	11.5A	9.8A	7.5A	6.7A	5.4A	3.68A	
	RATED POWER	50W	82.5W	125W	135W	156W	150W	153W	156W	156.6W	155.1W	153.6W	
	RIPPLE & NOISE (max.) <small>Note.2</small>	50mVp-p	80mVp-p	80mVp-p	100mVp-p	150mVp-p	150mVp-p	150mVp-p	150mVp-p	150mVp-p	250mVp-p	250mVp-p	
	VOLTAGE ADJ. RANGE	1.6 ~ 2.6V	2.6 ~ 4V	4 ~ 6V	6 ~ 9V	9 ~ 13.2V	13.2 ~ 16.8V	16.8 ~ 20V	20 ~ 26.4V	25 ~ 31V	30 ~ 40V	40 ~ 53V	
	VOLTAGE TOLERANCE <small>Note.3</small>	±3.0%	±2.0%	±2.0%	±2.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	
	LINE REGULATION	±0.5%	±0.5%	±0.5%	±0.5%	±0.3%	±0.3%	±0.3%	±0.2%	±0.2%	±0.2%	±0.2%	
LOAD REGULATION	±2.0%	±1.0%	±1.0%	±1.0%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%		
SETUP, RISE, HOLD TIME	1500ms, 50ms, 20ms at full load												
PROTECTION	OVER LOAD	121 ~ 150% rated output power				116 ~ 150% rated output power							
	OVER VOLTAGE	Protection type : Constant current limiting, recovers automatically after fault condition is removed											
FUNCTION	REMOTE INHIBIT CONTROL	RC+/RC-: 0 ~ 0.8V or OPEN, POWER ON				RC+/RC-: 4 ~ 12V POWER OFF							

■ 2 SLOT Single output (300W) MS-300

OUTPUT (MS-300)	OUTPUT VOLTAGE CODE	MS-300-2A	MS-300-2B	MS-300-2C	MS-300-2D	MS-300-2E	MS-300-2F	MS-300-2G	MS-300-2H	MS-300-2I	MS-300-2J	MS-300-2K	
	DC VOLTAGE	2V	3.3V	5V	7.5V	12V	15V	18V	24V	27V	33V	48V	
	RATED CURRENT	50A	50A	50A	40A	25A	20A	16.7A	12.5A	11.2A	9.1A	6.3A	
	CURRENT RANGE	0 ~ 50A	0 ~ 50A	0 ~ 50A	0 ~ 40A	0 ~ 25A	0 ~ 20A	0 ~ 16.7A	0 ~ 12.5A	0 ~ 11.2A	0 ~ 9.1A	0 ~ 6.3A	
	PEAK LOAD <small>Note.4</small>	57.5A	57.5A	57.5A	46A	29A	23A	19.2A	14.4A	12.9A	10.5A	7.2A	
	RATED POWER	100W	165W	250W	300W	300W	300W	300.6W	300W	302.4W	300.3W	302.4W	
	RIPPLE & NOISE (max.) <small>Note.2</small>	80mVp-p	80mVp-p	80mVp-p	100mVp-p	150mVp-p	150mVp-p	150mVp-p	150mVp-p	200mVp-p	250mVp-p	300mVp-p	
	VOLTAGE ADJ. RANGE	1.6 ~ 2.6V	2.6 ~ 4V	4 ~ 6V	6 ~ 9V	9 ~ 13.2V	13.2 ~ 16.8V	16.8 ~ 20V	20 ~ 26.4V	25 ~ 31V	30 ~ 40V	40 ~ 53V	
	VOLTAGE TOLERANCE <small>Note.3</small>	±3.0%	±2.0%	±2.0%	±2.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	
	LINE REGULATION	±0.5%	±0.5%	±0.5%	±0.5%	±0.3%	±0.3%	±0.3%	±0.2%	±0.2%	±0.2%	±0.2%	
LOAD REGULATION	±2.0%	±1.0%	±1.0%	±1.0%	±0.5%	±0.5%	±0.5%	±1.0%	±1.0%	±1.0%	±1.0%		
SETUP, RISE, HOLD TIME	1500ms, 50ms, 20ms at full load												
PROTECTION	OVER LOAD	116 ~ 150% rated output power											
	OVER VOLTAGE	Protection type : Constant current limiting, recovers automatically after fault condition is removed											
FUNCTION	REMOTE INHIBIT CONTROL	RC+/RC-: 0 ~ 0.8V or OPEN, POWER ON				RC+/RC-: 4 ~ 12V POWER OFF							

■ 1 SLOT Single output (75W) MS-75

OUTPUT (MS-75)	OUTPUT VOLTAGE CODE	MS-75L	MS-75M	MS-75N	MS-75O	MS-75P	MS-75Q						
	DC VOLTAGE	3.3V	5V	12V	15V	24V	48V						
	RATED CURRENT	15A	15A	6.3A	5A	3.2A	1.6A						
	CURRENT RANGE	0 ~ 15A	0 ~ 15A	0 ~ 6.3A	0 ~ 5A	0 ~ 3.2A	0 ~ 1.6A						
	PEAK LOAD <small>Note.4</small>	17.3A	17.3A	7.3A	5.8A	3.7A	1.8A						
	RATED POWER	49.5W	75W	75.6W	75W	76.8W	76.8W						
	RIPPLE & NOISE (max.) <small>Note.2</small>	80mVp-p	80mVp-p	150mVp-p	150mVp-p	150mVp-p	250mVp-p						
	VOLTAGE ADJ. RANGE	2.6 ~ 4V	4 ~ 6V	9 ~ 13.2V	13.2 ~ 16.8V	20 ~ 26.4V	40 ~ 53V						
	VOLTAGE TOLERANCE <small>Note.3</small>	±2.0%	±2.0%	±1.0%	±1.0%	±1.0%	±1.0%						
	LINE REGULATION	±0.5%	±0.5%	±0.3%	±0.3%	±0.2%	±0.2%						
LOAD REGULATION	±1.0%	±1.0%	±0.5%	±0.5%	±0.5%	±0.5%							
SETUP, RISE, HOLD TIME	1500ms, 50ms, 20ms at full load												
PROTECTION	OVER LOAD	116 ~ 150% rated output power											
	OVER VOLTAGE	Protection type : Constant current limiting, recovers automatically after fault condition is removed											
FUNCTION	REMOTE INHIBIT CONTROL	4.1 ~ 5V		6.1 ~ 7.5V		13.3 ~ 18V		16.9 ~ 22V		26.5 ~ 35V		53.1 ~ 60V	
	REMOTE INHIBIT CONTROL	Protection type : Shut down o/p voltage, re-power on to recover											
FUNCTION	REMOTE INHIBIT CONTROL	RC+/RC-: 0 ~ 0.8V or OPEN, POWER ON				RC+/RC-: 4 ~ 12V POWER OFF							

SPECIFICATION

■ 1 SLOT Isolated Dual output (100W) MD-100

OUTPUT (MD-100)	OUTPUT VOLTAGE CODE	MD-100R		MD-100S		MD-100T		MD-100U		MD-100V		MD-100W		MD-100X		
	DC VOLTAGE	5V	5V	5V	12V	5V	15V	24V	5V	24V	12V	12V	12V	12V	15V	15V
	RATED CURRENT	10A	8A	10A	4.2A	10A	3.4A	2.5A	8A	2.5A	3.4A	5A	3.4A	4A	2.7A	
	CURRENT RANGE	2 ~ 10A	0 ~ 8A	2 ~ 10A	0 ~ 5.8A	2 ~ 10A	0 ~ 4.7A	0.5 ~ 3A	0 ~ 10A	0.6 ~ 3A	0 ~ 4.7A	1 ~ 5A	0 ~ 5.8A	1 ~ 4.7A	0 ~ 4.7A	
	RATED POWER <small>Note.6</small>	90W		100.4W		101W		100W		100.8W		100.8W		100.5W		
	RIPPLE & NOISE (max.) <small>Note.2</small>	100mVp-p	100mVp-p	100mVp-p	150mVp-p	100mVp-p	150mVp-p	200mVp-p	100mVp-p	240mVp-p	120mVp-p	120mVp-p	120mVp-p	150mVp-p	150mVp-p	
	VOLTAGE ADJ. RANGE	4.75 ~ 5.5V	4.75 ~ 5.5V	4.75 ~ 5.5V	11.4 ~ 13.2V	4.75 ~ 5.5V	14.2 ~ 16.5V	22.8 ~ 26.4V	4.75 ~ 5.5V	22.8 ~ 26.4V	11.4 ~ 13.2V	11.4 ~ 13.2V	11.4 ~ 13.2V	14.2 ~ 16.5V	14.2 ~ 16.5V	
	VOLTAGE TOLERANCE <small>Note.3</small>	±3.0%	±3.0%	±3.0%	±3.0%	±3.0%	±3.0%	±3.0%	±3.0%	±2.0%	±3.0%	±2.0%	±3.0%	±2.0%	±3.0%	
	LINE REGULATION	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±0.5%	±1.0%	±0.5%	±1.0%	±0.5%	±1.0%	
	LOAD REGULATION	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±1.0%	±2.0%	±1.0%	±2.0%	±1.0%	±2.0%	
SETUP, RISE, HOLD TIME	1500ms, 50ms, 20ms at full load															
PROTECTION	OVER LOAD	105 ~ 150% rated output power Protection type : Shut down o/p voltage, re-power on to recover														
	OVER VOLTAGE	5.6 ~ 7.2V	5.6 ~ 7.2V	5.6 ~ 7.2V	13.3 ~ 17V	5.6 ~ 7.2V	16.6 ~ 22V	26.5 ~ 34V	5.6 ~ 7.2V	26.5 ~ 34V	13.3 ~ 17V	13.3 ~ 17V	13.3 ~ 17V	16.6 ~ 22V	16.6 ~ 22V	
FUNCTION	REMOTE INHIBIT CONTROL	RC+/RC-: 0 ~ 0.8V or OPEN, POWER ON RC+/RC-: 4 ~ 12V POWER OFF														
NOTE	<p>1. MP450:The value changed by installing different output modules. The efficiency in specification means output modules are composed by following modules. 5V(Voltage code C)*1, 12V(Voltage code E)*1, 24V(Voltage code H)*1, 5V(Voltage code M)*1. MP650:The value changed by installing different output modules. The efficiency in specification means output modules are composed by following modules. 5V(Voltage code C)*2, 12V(Voltage code E)*1, 24V(Voltage code H)*2. MP1K0:The value changed by installing different output modules. The efficiency in specification means output modules are composed by following modules. 5V(Voltage code C)*2, 12V(Voltage code E)*2, 24V(Voltage code H)*3.</p> <p>2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor.</p> <p>3. Tolerance : includes set up tolerance, line regulation and load regulation.</p> <p>4. 35% Duty cycle maximum within every 10 seconds. Average output power should not exceed the rated power.</p> <p>5. The power supply is considered a component which will be installed into a final equipment. The final equipment must be re-confirmed that it still meets EMC directives.</p> <p>6. If the output voltage adjust to higher level, the rated current should be derated to meet the total rated power for both outputs(For MD-100 only).</p>															

Table 1. Parallel code(For MS-300 only)

Code	SLOT1	SLOT2	SLOT3	SLOT4	SLOT5	SLOT6	SLOT7
X						----	----
1	⊙			⊙		----	----
2		⊙			⊙	----	----
3				⊙		⊙	
4					⊙		⊙
5	⊙			⊙		⊙	
6		⊙			⊙		⊙

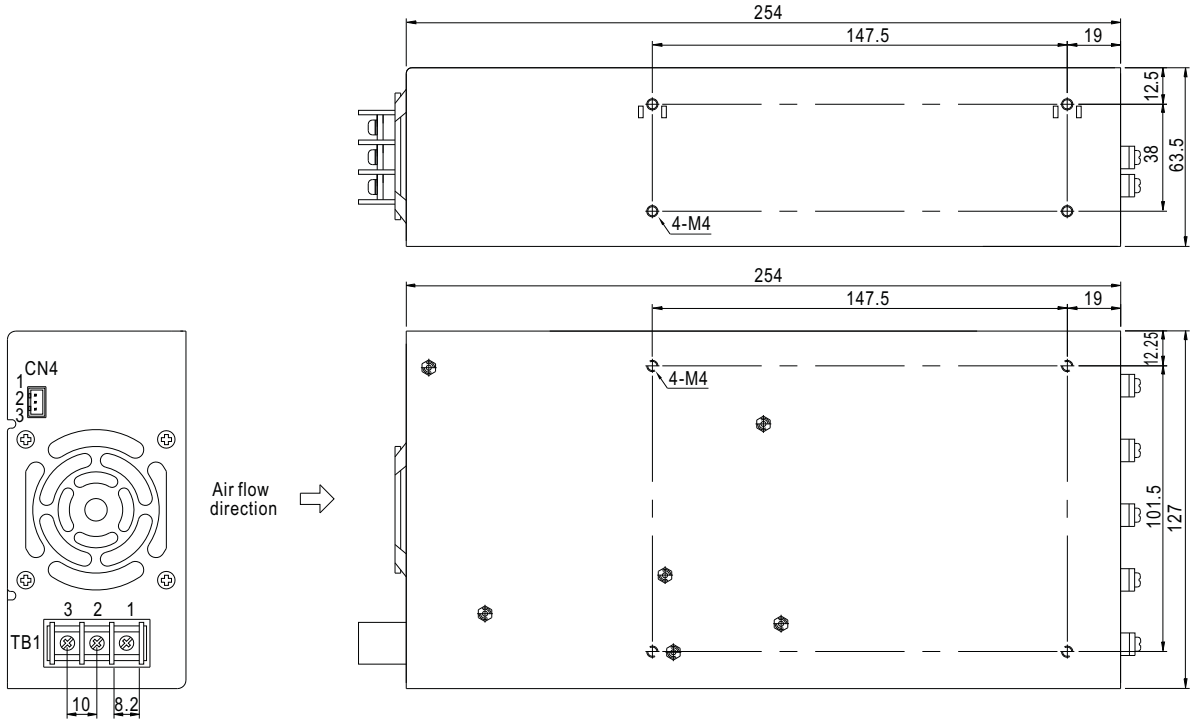
※ Code X,1,2 for MP450,MP650

※ Code X,1,2,3,4,5,6 for MP1K0

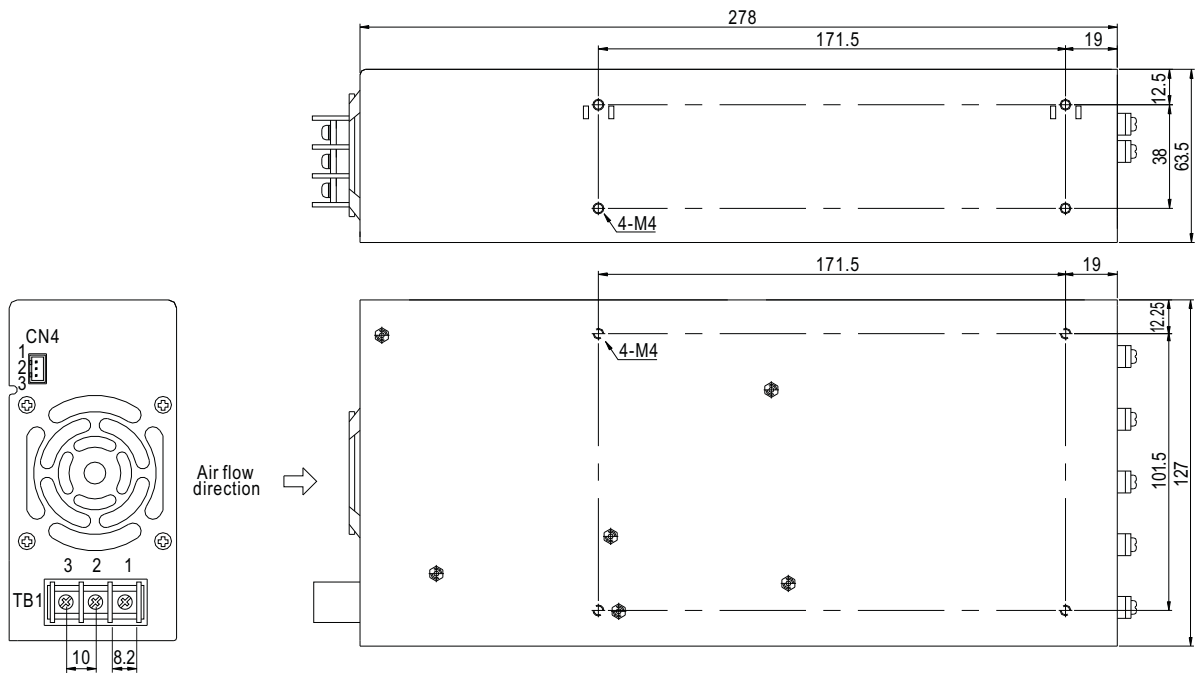
Mechanical Specification

Case No. Unit:mm

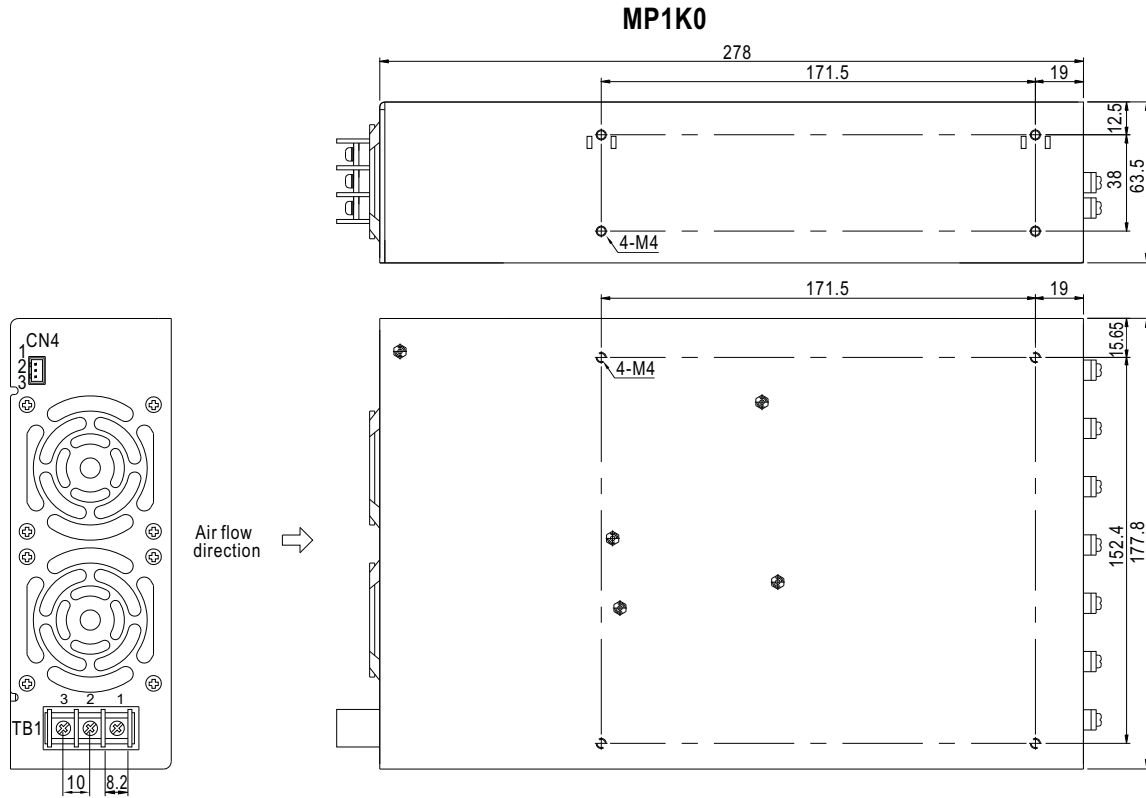
MP450



MP650



Mechanical Specification



TB1(PFC-450/650/1K0)

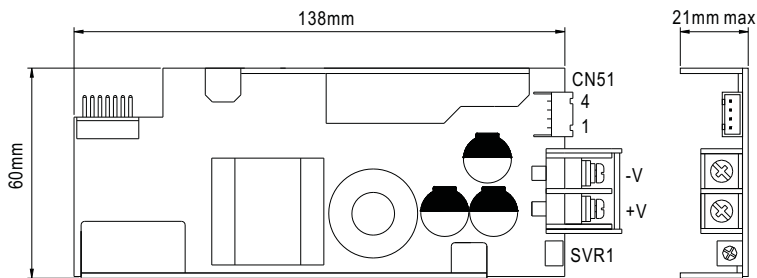
Pin No.	Assignment
1	AC/L
2	AC/N
3	FG ≐

CN4(PFC-450/650/1K0) : JST B3B-XH or equivalent

Pin No.	Assignment	Mating Housing	Terminal
1	+RC: +Remote ON/OFF	JST XHP or equivalent	JST SXH-001T-P0.6 or equivalent
2	-RC: -Remote ON/OFF		
3	VCC: 12V/0.1A auxiliary output		

Mechanism of Output Modules

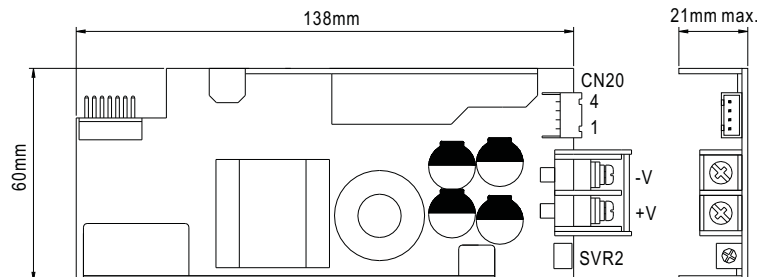
◎MS-75



Output Connector(CN51) : JST B4B-XH or equivalent

Pin No.	Assignment	Mating Housing	Terminal
1	+S: +Remote sensing	JST XHP or equivalent	JST SXH-001T-P0.6 or equivalent
2	-S: -Remote sensing		
3	+RC: +Remote ON/OFF		
4	-RC: -Remote ON/OFF		

◎MS-150

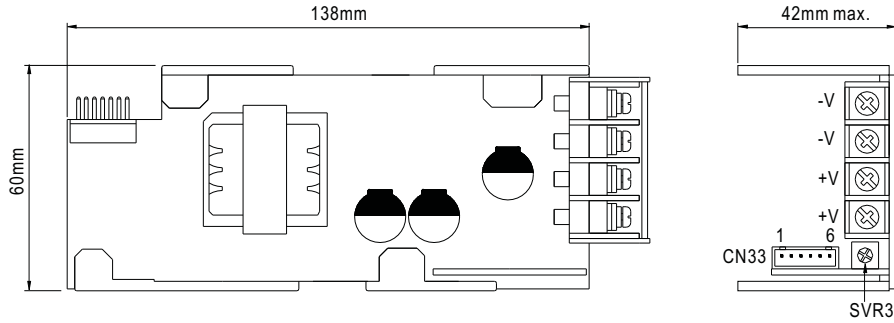


Output Connector(CN20) : JST B4B-XH or equivalent

Pin No.	Assignment	Mating Housing	Terminal
1	+S: +Remote sensing	JST XHP or equivalent	JST SXH-001T-P0.6 or equivalent
2	-S: -Remote sensing		
3	+RC: +Remote ON/OFF		
4	-RC: -Remote ON/OFF		

■ Mechanism of Output Modules

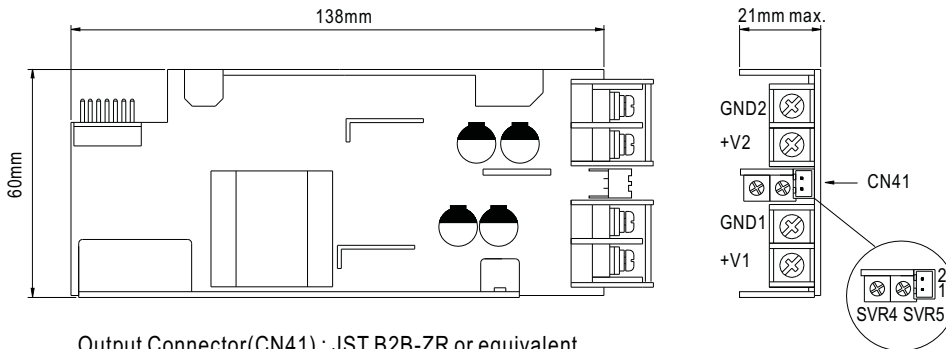
◎MS-300



Output Connector(CN33) : JST B6B-XH or equivalent

Pin No.	Assignment	Mating Housing	Terminal
1	+S: +Remote sensing	JST XHP or equivalent	JST SXH-001T-P0.6 or equivalent
2	-S: -Remote sensing		
3	+RC: +Remote ON/OFF		
4	-RC: -Remote ON/OFF		
5	P: Current sharing		
6	G: GND		

◎MD-100

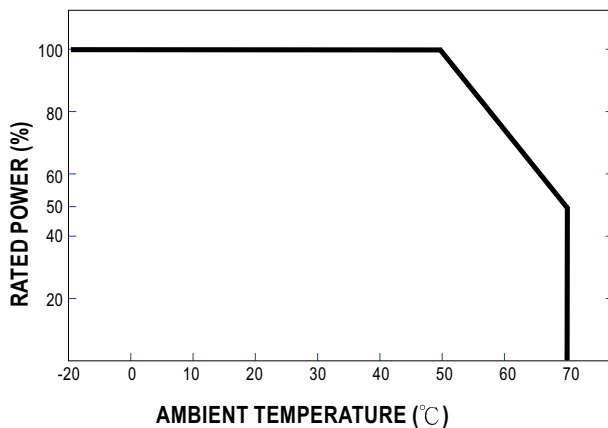


Output Connector(CN41) : JST B2B-ZR or equivalent

Pin No.	Assignment	Mating Housing	Terminal
1	+RC	JST ZHR-2 or equivalent	JST SZH-002T-P0.5 or equivalent
2	-RC		

- NOTE: 1.Remote ON/OFF of CN4 turn ON/OFF the entire power system
 2.Remote ON/OFF of CN20,CN33,CN41,CN51 turn ON/OFF the individual output module
 3.SVR1~5: DC output voltage adjustment(SVR4 for CH2 of MD-100,SVR5 for CH1 of MD-100)

■ Derating Curve



■ Static Characteristics

